

CLAIMS:

I claim:

1. An anti-islanding apparatus for isolating a power source from a failed electrical grid, comprising:
 - a power converter connectable between said power source and said grid;
 - a means for measuring a voltage of said grid;
 - a means for calculating a voltage trend in said grid voltage, using a present grid voltage measurement and a prior grid voltage measurement;
 - a means for calculating a positive feedback power converter control signal based on said voltage trend;
 - a control circuit connected to said power converter, wherein said control circuit applies said control signal to said power converter; and
 - a means of disconnecting said power source from said grid when said present grid voltage is outside pre-defined limits.
2. An anti-islanding apparatus according to claim 1, wherein said control signal comprises an acceleration function.
3. An anti-islanding apparatus according to claim 1, further comprising a means for measuring a frequency of said grid;
 - a means for calculating a frequency trend in said grid frequency using a present grid frequency measurements and a prior grid frequency measurement;
 - a means for calculating said positive feedback power converter control signal based on said frequency trend; and
 - a means of disconnecting said power source from said grid when said present grid frequency is outside pre-defined limits.
4. An anti-islanding apparatus according to claim 3, wherein said control signal comprises an acceleration function.

5. An anti-islanding apparatus according to claim 1, wherein when said power source is operating in a power limited condition, said control signal commands a lower power output in all cases.
- 5 6. An anti-islanding apparatus according to claim 1, wherein said means for measuring operates continuously.
7. An anti-islanding apparatus according to claim 1, wherein said means for measuring operates at intermittent intervals.
- 10 8. An anti-islanding apparatus for isolating a power source from a failed electrical grid, comprising:
a power converter connectable between said power source and said grid;
a means for measuring a frequency of said grid;
a means for calculating a frequency trend in said grid frequency using a present grid frequency measurements and a prior grid frequency measurement;
a means for calculating a positive feedback power converter control signal based on said frequency trend;
a control circuit connected to said power converter, wherein said control circuit applies said control signal to said power converter; and
a means of disconnecting said apparatus from said grid when said present grid frequency is outside pre-defined limits.
- 15 9. An anti-islanding apparatus according to claim 8, wherein a grid phase is calculated from said grid frequency.
- 20 10. An anti-islanding apparatus according to claim 8, wherein said means of measuring operates continuously.
- 25 30

11. An anti-islanding apparatus according to claim 8, wherein said means of measuring operates at intermittent intervals.
12. A method of preventing islanding of a power source on a distributed grid comprising the steps:
5 measuring grid voltage;
calculating a voltage trend in said grid voltage, using a present grid voltage measurement and a prior grid voltage measurement;
calculating a power converter control signal in a same direction as said voltage trend;
10 applying said power converter control signal to said power converter; and
disconnecting said power source when said present grid voltage measurement is outside acceptable limits.
13. An anti-islanding apparatus according to claim 12, further comprising:
15 measuring grid frequency;
calculating a frequency trend in said grid frequency, using a present grid frequency measurement and a prior grid frequency measurement;
calculating a power converter control signal in a same direction as said frequency trend;
20 applying said control signal to said power converter; and
disconnecting said power source when said present grid frequency measurement is outside acceptable limits.
14. A method of preventing islanding of a power source on a distributed grid according to claim 12, wherein said calculation of power converter control signal uses an accelerating function.
15. A method of preventing islanding of a power source on a distributed grid according to claim 12, further comprising;
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measuring grid phase;
calculating a phase trend in said grid phase, using a present grid phase
measurement and a prior grid phase measurement;
calculating a power converter control signal in a same direction as said phase
trend;
applying said control signal to said power converter; and
disconnecting said power source when said present grid frequency measurement is
outside acceptable limits.

16. A method of preventing islanding of a power source on a distributed grid
according to claim 12, wherein said steps of measuring, calculating, processing,
calculating and applying are performed continuously.

17. A method of preventing islanding of a power source on a distributed grid
according to claim 12, wherein said steps of measuring, calculating, processing,
calculating and applying are performed at intermittent intervals.

18. A method of preventing islanding of a power source on a distributed grid
according to claim 14, wherein said acceleration function is comprised of linear,
exponential, and geometric functions.

19. A method of preventing islanding of a power source on a distributed grid
according to claim 12, wherein said power converter control signal lowers voltage
in a power limited source.

20. A method of preventing islanding of a power source on a distributed grid
comprising the steps:
measuring grid frequency;
calculating a frequency trend in said grid frequency, using a present grid frequency
measurement and a prior grid frequency measurement;

calculating a power converter control signal in a same direction as said frequency trend;
applying said control signal to said power converter; and
disconnecting said power source when said present grid frequency measurement is outside acceptable limits.

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